



CRN NEWS

Issue 1

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Editor's Comments

This first issue of the CRN News introduces you to the U. S. Climate Reference Network (CRN) Program. In July 2003, CRN moved from the six-month Test and Evaluation Phase to a pre-operational phase for final tuning of the network, the website, the software, and data calibration checks. We are hopeful that we can declare the CRN "commissioned" by the end of this year. With this semi-annual newsletter, we plan to communicate CRN progress and plans to: scientific data users, instrument researchers, and those interested in sustaining operational research networks.

The primary goal of the CRN is to provide future long-term observations of surface air temperature and precipitation. CRN data can (after scientific evaluation and acceptance) be coupled to past long-term observations for the detection and attribution of present and future climate change. We intend for users to become familiar with locations of the sites, the data, instruments, metadata, and the documentation describing the operations of the network. Your comments in improving the network, its data and products are welcome.

The CRN, the Nation's benchmark climate reference, is being implemented by applying the "Ten Climate Monitoring Principles" (see box) and it meets the requirements of the Global Climate Observing System. Integration of the CRN with other networks and programs will provide a long-term (50 to 100 years) high quality observational record that will serve multiple needs.

The CRN Program is being implemented by two NOAA line offices, National Environmental Satellite, Data, and Information Service (NESDIS) and Office of Oceanic and Atmospheric Research (OAR) with cooperation by another NOAA line office, the National Weather Service (NWS). NESDIS's National Climatic Data Center (NCDC) in Asheville, NC, and Office of

System Development (OSD) in Suitland, MD, work with OAR's Atmospheric Turbulence and Diffusion Division (ATDD) located in Oak Ridge, TN. ATDD installs and maintains the CRN instrument suites. OSD has extensive experience establishing and maintaining ground systems and guides the program budget and execution. NCDC oversees the science component and the selection of sites for climate purposes utilizing NOAA partners, the Regional Climate Centers (RCCs). Issues related to science are presented to an external Science Advisory Panel which consists of interested scientists and stakeholders. The panel met once and plans to meet again in Oct. 2003.

The CRN team is at your service.
Mike Helfert.

Testing and Evaluation Phase Complete

The purpose of the CRN Test and Evaluation has been to verify that the program is well positioned to proceed with installation and operation of the network before the balance of the systems are deployed. The demonstration phase was, in essence, the CRN implementation program, but on a smaller scale. The six month test period (Jan.-June, 2003) minimized risk to the final system implementation by: 1) providing data and products to the user community for comment; 2) establishing sites in different climatic regimes; 3) gaining experience with the "end-to-end" activities including performance of site surveys, site acquisition, installation, operation, maintenance, and communications management; and 4) analyzing data from existing deployed sites to assess the validity of current instrumentation.

The Test and Evaluation was managed by OSD working with NCDC and ATDD. The

formal evaluation period, January through June 2003 concluded with an evaluation report presentation July 9-10, 2003 for the Test Review Board which covered all aspects of the Program and focused on evaluation of field sensors; central processing capabilities at NCDC; site selection and installation; operations; quality control; communications capacity; maintenance; and configuration management. Another important aspect is assuring the cost-effective expandability and supportability of the full program for the long term.

The Test Review Board will provide recommendations to the CRN Executive which will decide on the course of action.

10 PRINCIPLES OF CLIMATE MONITORING:

- Assess the impact of network changes on future climatology
- Make overlapping measurements to derive transfer functions
- Metadata should fully document the observing system and its operating procedures
- Routinely assess the quality and homogeneity of the current and historical data
- Integrate environmental assessments into the Global Observing System strategy
- Give Priority to maintaining stations with a long (century-scale) homogeneous data record
- Improve monitoring coverage--in data-poor regions, poorly observed variables, regions sensitive to climate change, inadequate temporal resolution
- Include climate monitoring requirements at the outset of network design
- Maintain a stable, long-term commitment to these observations and to climate change monitoring
- Provide low cost freedom of access to the data and metadata

T. Karl, et al, 1999. Adequacy of Climate Observing Systems. National Research Council.

The Site Survey:

A critical task of the CRN program is selecting the best locations to serve as CRN sites. Dr. Michael J. Janis, of the Southeast Regional Climate Center, has the responsibility of coordinating site surveying work between four Regional Climate Centers (RCCs) (Western, Northeastern, High Plains, and Southeast) and NCDC. RCCs conducted site surveys, assessing local-scale characteristics that affect climate at individual locations to identify long-term, stable environments.



Much appreciation goes to the many site surveyors: Barry Keim, Brian Ayers, Buffy Summer, Carl Sawyer, Dan Graybeal, David Stooksbury, John Christy, Patrick Michaels, Stuart Foster, Francisco Ball-este, George Taylor, Greg Zielinski, James Budd, Keith Eggleston, Kelly Redmond, Lance Seaman, Larry Gabric, Mark Turner, Milt Brown, Rich Robbins, and Sam Baker. All have worked unstintingly in all weather conditions in the site hunt and our thanks go out to them. Kelly Redmond of the Western Regional Climate Center broke the record by surveying over 100 potential sites before taking his well-deserved retirement.

The priorities focused on site characteristics for installation of instrument suites in various climate regimes (with a separate focus on the eastern, middle, and western thirds of the country). The CRN Spatial Density Study Report provides guidance on the approximate geographic locations for a fully populated network of observing sites, but RCC experience, knowledge, and judgment is what is required to select potential general areas and then identify and study more specific sites within these areas. They have been seeking sites with a strong likelihood of remaining essentially uninfluenced for 50 years particularly regarding possible future encroachments by human structures.

The Site Information Handbook outlines objectives in defining an ideal site. The Le-roy classification scheme, modified for use

by the CRN program, is used to judge the quality of meteorological measurements at each site with respect to eliminating local influences that are not characteristic of the region. The most desirable local surrounding landscape is a relatively large and flat open area with low local vegetation in order that the sky view is unobstructed in all directions except at the lower angles of altitude above the horizon.

The surveyors research each piece of property and assess local-scale characteristics as part of their study to determine the suitability of these biomes to represent the prevailing climate. Over 300 site surveys have been completed to date and indicate the intense efforts by Michael Janis and all who have given their time and effort.



News from the Field

Installing a CRN site requires diversified skills. Typically, one engineer and two technicians from ATDD proceed out to the field with a truckload of equipment and "The Complete Guide to Installing a CRN Site". Over a period of three to five days they supervise and use everything from heavy machinery and equipment to fine calibration instruments. A backhoe, concrete mixer, tractor, trencher, and a gas powered auger are used to clear the land where necessary, set the instrument pad, and drill holes for the fences. Following the installation guide, instruments are mounted, wired together, and tested. Though all instruments are calibrated in ATDD's laboratory in Oak Ridge, a final recalibration of the Geonor gauge ensures optimal operations.

Following formal Site Acceptance procedures, a check list shows that step-by-step procedures were followed, that all systems are in working order and that all metadata, such as instrument serial numbers, formulas, and calibration coefficients, are logged into the station database at NCDC.

After Site Acceptance, data are monitored for quality and completeness as part of the Site Commissioning. With thirty plus sites already installed, the ATDD team is again on the road in Colorado, Idaho and Oregon

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Others to whom credit is due for providing support in the CRN development phase are quite numerous: Mike Young, Hal Bogin, Richard Brooks, Dan Dellinger, Sara Veasey, Mike Burgin, Tom Peterson, Matt Menne, John Hughes, John Jensen, Richard Heim, Sharon Leduc, and a host of others at NOAA's RCC's, the NWS, UCAR/NCAR, the Univ of Nebraska and Illinois, Louisiana State Univ, the State Climatologists, and our families who have supported us in this intense period.

preparing more sites for Installation, Acceptance and Commissioning



AMS Call for Papers

A session on "Sustained in-situ Meteorological Networks to Monitor Climate Change" will be held in conjunction with the Eighth Symposium on Integrated Observing and Assimilation Systems for Atmosphere, Oceans, and Land Surface (IAOS-AOLS). This special session invites papers that include overviews of national and international networks, managing and maintaining networks, site selection, quality of the measurements, and integration of different in-situ observing systems to monitor climate change. The symposium will be held during The American Meteorological Society's 84th Annual Conference scheduled for 11-15 January 2004 in Seattle, WA. Please send your abstracts before October 1, 2003 to Session Chair, Dr. Bruce Baker, NCDC Asheville, NC 28801 bruce.baker@noaa.gov. Early submissions will merit more attention.